Water Supply Assessment
for
North San José
Development Policies Update

June 2005

Prepared for

City of San José
San José, California

Prepared by

Todd Engineers
2200 Powell Street, Suite 225
Emeryville, California 94608
510-595-2120 / Fax 510-595-2112
toddengineers.com

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INTRODUCTION

Background

The City of San José proposes to intensify development in its northern portion, referred to as North San José. Currently, the area is characterized by industrial parks with scattered enclaves of high and medium-high density residential land uses. The proposed intensification would increase industrial, office, and research and development (R&D) building space, encourage taller office buildings along the existing light rail system, and substantially increase residential development. The North San José project entails modification of relevant plans and policies, including the City's General Plan, and implementation of infrastructure improvements to support the proposed development. The project is described in detail in the *Draft Program Environmental Impact Report: North San José Development Policies Update* (City of San José, March 2005; hereafter referred to as *North San José DEIR).*

The project entails increased water demands; existing water supply providers in the area are the San José Water Company and City of San José. This report addresses the portion of North San José served by the City of San José. Proposed sources of water supply include additional imported water from the City of San Francisco Public Utilities Commission (SF PUC) Hetch Hetchy water system, groundwater from the Santa Clara Valley groundwater basin (which is managed by Santa Clara Valley Water District), and recycled water.

The *North San José DEIR* also acknowledges the availability of recycled water in the area. Recycled water for landscape irrigation use is produced by the San José-Santa Clara Water Pollution Control Plant (WPCP) located in Alviso. A recycled water pipeline conveys water from the WPCP along the eastern boundary of the North San José area and has three extensions into the area. Use of recycled water in the area would require installation of additional recycled water pipelines.

The California Water Code section 10910 (also termed Senate Bill 610 or SB610) requires that a water supply assessment be provided to cities and counties for a project that is subject to the California Environmental Quality Act (CEQA). The cities and counties are mandated to identify the public water system that might provide water supply to the project and then to request a water supply assessment. The water supply assessment documents sources of water supply, quantifies water demands, evaluates drought impacts, and provides a comparison of water supply and demand that is the basis for an assessment of water supply sufficiency. If the assessment concludes that water supplies are or will be insufficient, then the public water system must provide plans for acquiring the additional water. According to the Water Code section 10911, if the water supplies are deemed insufficient, the City is required to provide plans for acquiring additional water supplies. These plans may include, but are not limited to, information concerning all of the following:

- Estimated total costs and the proposed method of financing the costs for acquiring the

additional water supplies
- All federal, state, and local permits, approvals, or entitlements to acquire and develop the additional water supplies
- The estimated timeframes to acquire the additional water supplies.

If the lead agency decides that the water supply is insufficient, the lead agency may still approve the project, but must include that determination in its findings for the project and must include substantial evidence in the record to support its approval of the project.

Purpose

The purpose of this Water Supply Assessment is to document the City of San José's existing and future water supplies for its North San José/Alviso service area and compare them to the area's build-out water demands, including the portions of the North San José project within the City's service area. This comparison, conducted for both normal and drought conditions, is the basis for an assessment of water supply sufficiency in accordance with the requirements of California Water Code section 10910 (Senate Bill 610 or SB610).

Figure 1 shows the location of the North San José/Alviso service area with reference to the Santa Clara Valley groundwater subbasin boundaries.

Acknowledgements

This assessment was prepared by Iris Priestaf, Maureen Reilly, and Katherine White. We appreciate the valuable assistance provided by the City of San José staff including Akoni Danielsen and Andrew Crabtree of the Department of Planning and Mansour Nasser and Robert Wilson of the Environmental Service Department, Municipal Water System. We acknowledge the considerable cooperation of Santa Clara Valley Water District, namely Jim Crowley, Behzad Ahmadi, and James O'Brien.

WATER DEMAND

This section summarizes water demands for the study area. The first part describe the factors affecting total water demand, including climate, population, and the mix of customer types, such as residential, industrial, commercial, and landscaping. The second part documents water demands not only under normal climatic conditions, but also during drought.

Climate

Climate has a significant influence on water demand on a seasonal and annual basis. This influence increases with the portion of water demand for outside uses, primarily landscaping or agricultural irrigation. North San José/Alviso is characterized by industrial parks and high-density residential areas that include irrigated landscaping areas. With regard to seasonal influences, rainfall in the winter months fulfills much of the water demand for irrigation, while lack of rainfall during the warm, high-evapotranspiration summer season results in peak monthly water demands that are nearly twice that of winter. With regard to annual influences, the local climate is subject to recurring droughts during which water demands would tend to increase, barring water conservation measures.

Table 1 summarizes representative climate data for the study area, including average monthly precipitation, temperature, and evapotranspiration (ETO). The City of San José has a semi-arid, Mediterranean climate, characterized by warm dry summers and cool winters. The North San José project's location near San Francisco Bay results in some moderation of summer temperatures and evapotranspiration. As indicated in the table, precipitation occurs primarily in the winter months (November through April) and averages 14.3 inches per year.

Figure 2 is a chart of annual rainfall from calendar year 1949 through 2001 for the NOAA San José station. As illustrated in **Figure 2**, San José is subject to wide variations in annual precipitation; an extreme single-year drought occurred in 1976, when annual rainfall amounted to only 7.2 inches, or about one-half of the average rainfall. A severe, prolonged drought occurred in the late 1980s and early 1990s; over a four-year period, annual rainfall averaged only two-thirds of the annual average.

Population

In general as population increases, so does water demand. The North San José project entails increases in residential housing and population beyond that included in the current General Plan. These increases will result in increased water demand. **Table 2** summarizes population projections for Alviso and North San José, including both the City's service area and that of San José Water Company. As shown, the population of the City's portion of North San José is expected to increase five-fold from 9,613 to 50,222 people.

The population values for the Year 2000 are derived from US Census data. North San José

population for 2005 was estimated from 2000 values plus known new construction. The future projections for North San José are based upon new residential development and 1.77 people per housing unit. The population in North San José is estimated to increase by 56,640 people (75,206 – 18,566) from 2005 to 2025.

The Alviso population is provided to allow computation of a total North San José/Alviso service area population. According to the 2000 Census, Alviso (defined by zip code 95002) has a 2000 population of 2,128 people. City of San José Municipal Water System staff assumed a typical growth rate of about 1.5 percent per year to determine future population (Robert Wilson, personal communication); this rate results in a population in 2025 of 3,088, as shown in **Table 2**. It is noteworthy that Alviso population decreased slightly between 1990 (2,179) and 2000 (2,128). Accordingly, the projected population growth rate for Alviso, while possible, is likely overestimated.

Water Use Sectors and Water Demand

Table 3 documents the water demand for the City's North San José/Alviso service area by water use sectors for the years 1990, 1995, 2000, and current conditions. Water use data are not available for the entire year 2005, so data for 2004 are provided. **Table 3** also provides the projected water use in five-year increments out to 2025. The water use sectors (customer types) are listed on the left; public customers include institutional and government sectors. Irrigation is equivalent to landscape irrigation, because no significant agriculture exists in the area. There are no sales to other agencies, saltwater barriers, groundwater recharge, or conjunctive use projects in North San José/Alviso. Temporary uses are primarily related to construction.

The uppermost portion of **Table 3** summarizes water demands for the North San José portion of the City's service area. As shown, industrial uses have been the source of much of the historic and current water demand, accounting for about 35 to 60 percent. Irrigation water demand has accounted for about 30 to 35 percent of total water demand (or about 1,200 to 1,900 AFY); this is significant because it represents an opportunity for recycled water use. Residential water demand, primarily for multi-family residential complexes, has been about 20 percent of the total. While the City maintains separate irrigation meters for many parcels, some landscape irrigation use is included in the residential water demand values. Again, this represents an opportunity for recycled water use.

Future water demands for North San José reflect the changes in land use plans and policies described in the *North San José DEIR* (City of San José, March 2005). No potential change in water demand is expected for single-family residential, industrial, and public land uses or for temporary (i.e., construction) water use. A small increase of 312 AFY is expected for the commercial sector from 157.5 AF in 2004 to 469.4 AF in 2025. Similarly, irrigation water demand is expected to increase by 381 AF by 2025. The major change is the estimated increase in water demand for multi-family residential land uses, which is estimated to change from the current 854 AFY to 6,291 AFY in 2025, an increase of 5,437 AF.

The middle portion of **Table 3** summarizes water demands for the Alviso portion of the City's

service area, while the bottom portion provides the total for North San José/Alviso. As indicated, the preponderance of the water demand is and will continue to be in North San José.

The estimated increases in water demand shown in **Table 3** are based on rates provided in the *North San José DEIR,* as follows:

Industrial usage: 0.18 gallons per day per square foot (gpd/sf)
Office usage: 0.0751 gpd/sf
Multi-family residential: 225 gallons per day per dwelling unit (gpd/du)

City of San Jose staff members researched water demand for multi-family residences (Andrew Crabtree and Mansour Nasser, personal communications). This research included two selected multi-family complexes. One is a relatively new apartment complex with an average water demand of 131 gpd/du, including estimated landscape use. The second apartment complex consists of 8 buildings and 941 units. Water use is monitored by a water meter for each building; in addition, there are two meters that monitor irrigation and one meter that monitors other areas of the complex (i.e., the pool). In 2004, the average potable water demand was 182 gpd/du and the total demand (including irrigation) was 225 gpd/du. Nineteen percent of the total water demand for this complex was used for irrigation.

In addition, it is noteworthy that total residential water use in 2004 in North San José was 988 acre-feet. According to City records, this water serves 4,637 residential units and provides irrigation for some of the multi-family complexes. The average use per unit, including some irrigation, was 190 gpd/du.

In brief, the above analysis indicates that the water demand rate of 225 gpd/du for multi-family residential land use probably is on the high end of the range, particularly when considering future developments that will be constructed in accordance with current water-saving technologies and building codes.

Figure 3 illustrates the total annual water demand for North San José/Alviso, including the annual data for 1990 – 2004 and the five-year projections to 2025. **Figure 3** clearly shows the projected increase for multi-family residential demands. Note that landscape irrigation was first distinguished in 1995; previously, irrigation was subsumed in the other water use sectors.

Water Demand in Normal and Drought Periods

The City of San José *2000 Urban Water Management Plan Update* (City of San José, February 2001) addresses water demands for the City's water service areas, including North San José/Alviso. The Update describes the response to the severe, prolonged drought of 1987 through 1991, which involved an overall decline in water demand in response to water conservation and rationing.

Figure 4 shows water use in North San José/Alviso from 1970 through 2004, including the recent drought. As shown, water use declined significantly in the drought years of 1989, 1990,

and 1991. Water use prior to the drought in 1987 amounted to 3,697 AF and then declined to an average of 2,830 AFY over the three drought years; this represents a decline of 23 percent. After the drought, water use rebounded and then increased steadily, resuming the growth pattern prior to the drought.

Table 4 and **Table 5** presents an analysis of how water demand can change in response to drought. **Table 4** represents existing land uses and customer types and **Table 5** represents future land uses and customer types with the proposed project.

The left columns in the table show the customer types (water use sectors) in North San José/Alviso and the water demand in a "normal" rainfall year. For this analysis, the year 2000 was selected because it is representative of recent water demand conditions. In addition, the rainfall in calendar year 2000 approximated the long-term average rainfall of 14.3 inches.

North San José/Alviso responded to the drought years of 1989, 1990, and 1991 with a reduction in water demand of 23 percent. For the purposes of this analysis, a generalized response is assumed involving a 25 percent reduction in total demand for a single-year and three-year drought. This is consistent with Stage 2 of the 2000 City of San José Water Shortage Contingency Plan (City of San José, February 2001), which responds to a water shortage with mandatory water use reductions. As shown on the bottom row of **Table 4**, the water demand of 5,599 AFY in 2000 would be reduced to about 4,164 AFY in drought years.

Data on water demand by customer type are available for 1990 to the present, and thus are not available prior to the drought. Accordingly, the drought-induced water demand reduction by customer type is not known. However, water demand data by customer type are available for the drought year of 1991 and for 1992, when water demand rebounded. This "rebound" information was used to estimate the preceding drought response by customer type. **Table 4** shows the rebound in water demand that occurred in North San José/Alviso from 1991 to 1992 and the corresponding rounded-off value for estimated drought reduction.

As shown, the most significant rebound/drought reduction is for public water use, reflecting reduction in irrigation of public parks. Data are not available for landscape irrigation, so a reduction of 40 percent is assumed in **Table 4**, based primarily on the public water use response. Residential response is about 25 percent, while the industrial and commercial response is 10 and 15 percent respectively. The remaining four columns on the right side of **Table 4** present the reduction in water demand that can occur in response to drought. It was assumed that the water reduction totals would be the same in response to single and multi-year droughts.

It is important to note that the **Table 4** response is based on existing customer types, a historical response to a recent drought, and a water supply that did not include recycled water for irrigation at the time. In the future, the drought response may differ, depending on the future mix of customer types, water conservation practices, and amount of water recycling.

A different mix of customer types would result in different opportunities and capacities for water conservation. However, as shown in **Table 5**, the proposed North San José development involves

mostly multi-family residential, which has an estimated conservation potential of about 25 percent. This is the same as the overall response to drought. Accordingly, the land use change in the area is not expected to change the overall drought response. Installation of water-conserving plumbing (as mandated by the current building code) will conserve water overall, but will reduce the ability to save water in the short term, a phenomenon termed “demand hardening.” This is not accounted for in **Table 5**. Lastly, given the reliability of recycled water in normal years and in drought, its future use would obviate the need for significant landscape irrigation conservation. This is approximated in **Table 5** by assuming that the demand for irrigation and public use is not reduced during drought. As in **Table 4**, it was assumed that the water demand response would be the same for single and multi-year droughts.

WATER SUPPLY

The water supply for the North San José/Alviso area currently is provided primarily by the City of San Francisco Public Utilities Commission (SF PUC) Hetch Hetchy water system, with local groundwater serving as a backup water supply. Recycled water has been used in the area since 1998. Proposed sources of water supply include additional imported water from the Hetch Hetchy water system, groundwater from the Santa Clara Valley groundwater basin (which is managed by Santa Clara Valley Water District in collaboration with local water agencies), and additional recycled water. In addition, water conservation is anticipated to reduce water demand from current projected amounts.

Table 6 lists the existing and proposed water supply sources in terms of water rights, entitlements, and contracts. **Table 7** summarizes past, current, and projected water supply sources under normal conditions. Data are reported in five-year increments in order to provide a long-term overview. For the historical data, a near-normal rainfall year was selected to represent each five-year increment, as summarized in the footnote to **Table 7**.

Wholesale Water Supply

North San José/Alviso is provided water from the SF PUC Hetch Hetchy aqueduct by means of two turnouts. As indicated in **Table 6**, the City of San José currently has a contract for up to 3,000 AFY (2.68 million gallons per day or mgd); this contract is temporary and interruptible with a two-year notice by SF PUC. Pertinent portions of the Settlement Agreement and Master Water Sales Contract between SF PUC and suburban retailers are reproduced in **Appendix A**, while the Water Supply Contract between the City and County of San Francisco and City of San José is reproduced in **Appendix B.**

The Master Contract, in effect until 2009, has recently been renegotiated, as documented in **Appendix C**. The City of San José requested up to 6.35 mgd (7,100 AFY), based on its existing General Plan. The SFPUC will supply 6.28 mgd (7,040 AFY) in 2010; subsequently, the contract will increase to 6.35 mgd (7,100 AFY) in 2015 and remain at that level until 2025.

The North San José project is not included in the existing General Plan, and therefore was not included in the request to SF PUC. However, additional growth in the North San José area is included in the existing General Plan and request to SF PUC. If the North San José project, including modification of the General Plan, is approved, this would provide the appropriate basis for a revised request to SF PUC. Assuming preferred use of Hetch Hetchy water for potable supply and continued use of groundwater as a supplemental source, a revised request would be about 8,000 AFY (Mansour Nasser, personal communication).

Table 7 shows that the City of San José has been able to obtain more water than its contracted amount under normal water supply conditions. For example, in 1985 the City received 3,255 AF. Delivered amounts in 1992 were reduced to 2,428 AF in response to the drought that had just ended; however, deliveries increased in subsequent years to exceed 5,300 AFY.

Groundwater Supply (SCVWD)

As indicated in **Table 6**, groundwater has been a source of supply for North San José/Alviso. Groundwater is available from the Santa Clara Valley groundwater basin, which is managed by Santa Clara Valley Water District (SCVWD) in collaboration with other agencies. The City of San José currently has four wells in North San José; the locations of Wells 1, 2, 3, and 4 are shown on **Figure 1**. The wells, installed in 1981 and 1983, are 600 to 615 feet in depth with screens generally between 200 and 615 feet in depth.

The combined capacity of the four wells is reported at 5,600 gpm (City of San José, February 2001). Assuming these wells were pumped on a year-round basis for 12 hours per day, they would produce 4,500 AFY. However, the wells are maintained as a backup supply and have been operated primarily during drought. As shown in **Figure 4,** groundwater was used primarily between 1984 and 1998. Maximum annual pumping occurred in 1991, with pumping of 924 AF. On **Table 6**, no entitlement or water right is indicated because the Santa Clara Valley groundwater basin has not been adjudicated and groundwater entitlements or rights have not otherwise been defined.

In the North San José DEIR, groundwater is identified as a source of water supply for the project. Assuming that groundwater would serve as a supplemental source of supply (with Hetch Hetchy as the primary potable source and recycled water as the irrigation source), the amount of groundwater to be pumped can be estimated as the residual of the equation:

Water demand – Hetch Hetchy supply – Recycled water supply = Groundwater supply.

This estimate, summarized below for normal years, indicates groundwater pumping of about 319 to 2,708 AFY in 2025, depending on the use of recycled water.

Year	Water Demand (AFY)	Hetch Hetchy (AFY)	Recycled Water (AFY)	Difference (AFY)
2005*	5,969	5,300	608	0
2010	7,510	7,040	1,362 - 3,645	0
2015	9,050	7,100	1,682 - 4,000	0 - 268
2020	10,590	7,100	2,002 - 4,355	0 - 1,488
2025	12,130	7,100	2,322 - 4,711	319 - 2,708

In the DEIR, the City of San José Municipal Water System indicated the need to install three additional production wells; these would be located in North San José in the area south of Highway 237. New wells likely would be constructed similarly to the existing wells with screens in the deep aquifer. Assuming similar well capacities and reasonable operation (as noted above on a year-round basis for 12 hours per day), three additional wells could pump about 3,000 AFY.

The long-term reliability of groundwater supply for the project is not likely to be predicated on

well capacity, but is likely to be defined by the overall state of the groundwater basin. This is recognized by the SB610 sections of the California Water Code, which require a detailed description and analysis of the location, amount, and sufficiency of groundwater to be pumped. The following sections describe the Santa Clara Valley groundwater basin, its management, and existing condition in terms of groundwater quantity and quality.

Santa Clara Valley Groundwater Basin

North San José/Alviso overlies the Santa Clara subbasin of the Santa Clara Valley Groundwater Basin, designated by the Department of Water Resources (DWR) with groundwater basin number 2-9.02 (California DWR, October 2003). The Santa Clara subbasin occupies a structural trough between the Diablo Range on the east and the Santa Cruz Mountains on the west. It extends from the northern border of Santa Clara County to Coyote Narrows. The Santa Clara valley is drained to the north by tributaries to San Francisco Bay including Coyote Creek and the Guadalupe River, which bound the North San José/Alviso area on the east and west. **Figure 1** shows boundaries of the Santa Clara Valley subbasin as defined by SCVWD; these differ slightly from those defined by DWR.

The principal water bearing formations of the Santa Clara subbasin are alluvial deposits of unconsolidated to semi-consolidated gravel, sand, silt and clay (DWR, October 2003). The permeability of the valley alluvium is generally high and most large production wells derive their water from it (DWR 1975). The southern portion and margins of the subbasin are unconfined areas, characterized by permeable alluvial fan deposits. A confined zone is created by an extensive clay aquitard in the northern portion of the subbasin, including North San José/Alviso (SCVWD, July 2001). This aquitard divides the water-bearing units into an upper zone and a lower zone; the latter is tapped by most of the local wells.

Groundwater in the Santa Clara subbasin is recharged through natural infiltration along stream channels and by direct percolation of precipitation. In addition, SCVWD maintains an active artificial recharge program. Groundwater flow generally is from the margins of the basin toward San Francisco Bay.

Water Resources Management

SCVWD is the groundwater management agency in Santa Clara County (as authorized by the California legislature under the Santa Clara Valley Water District Act) and has the primary responsibility for managing the Santa Clara Valley groundwater basin. SCVWD has worked to minimize subsidence and protect groundwater resources through artificial recharge of the groundwater basin, water conservation, acquisition of surface water and imported water supplies, and prevention of water waste.

The District's principal water supply planning document is the Integrated Water Resources Plan (IWRP); the draft IWRP has identified the operation of the groundwater basin as a critical component to help SCVWD respond to changing water supply and demand conditions (SCVWD, June 2004). In addition, SCVWD has prepared a *Santa Clara Valley Water District*

Groundwater Management Plan (SCVWD, July 2001), which summarizes its groundwater supply management, groundwater monitoring, and groundwater quality management programs.

The groundwater supply management program is intended to replenish the groundwater basin, sustain the basin's water supplies, help to mitigate groundwater overdraft, and sustain storage reserves for use during dry periods. SCVWD operates artificial recharge systems to augment groundwater supply, including the groundwater underlying North San José/Alviso. SCVWD also conserves local surface water, provides imported water, operates water treatment plants, maintains water conveyance systems, supports water recycling, and encourages water conservation.

Groundwater Quantity

Groundwater conditions throughout the County, including the northern Santa Clara Valley, are generally very good, reflecting SCVWD's water management efforts (SCVWD, July 2001) Historically, groundwater pumping caused groundwater level declines that induced subsidence in the Santa Clara subbasin and saltwater intrusion into aquifers adjacent to San Francisco Bay. These declines were halted in the mid-1960s and then reversed through the artificial recharge program and the importation of surface water via the Hetch Hetchy Aqueduct and South Bay Aqueduct. Groundwater levels in the Santa Clara Valley have generally risen since 1965 as demonstrated by hydrographs of index wells monitored by SCVWD; these hydrographs can be viewed online:

http://www.valleywater.org/Water/Where_Your_Water_Comes_From/Local_Water/Wells/Depth-to-Water_Index_Well_Hydrographs.shtm

SCVWD recognizes the benefits of using the vast subsurface storage provided by the groundwater basin, particularly during drought. SCVWD has defined an operational groundwater storage capacity that amounts to 350,000 acre-feet in the Santa Clara Valley subbasin (SCVWD, 2001). This storage is defined in part by the groundwater levels that need to be maintained to prevent subsidence and saltwater intrusion problems. These problems are significant to North San José/Alviso; the historical center for subsidence (with land surface declines up to 13 feet) is just south of North San José (Poland, 1971). In addition, the area affected by saltwater intrusion includes much of Alviso, with the greatest inland intrusion of mixed water occurring between the Guadalupe River and Coyote Creek (SCVWD, July 2001).

In its *Integrated Water Resources Plan*, SCVWD has analyzed the reliability of its water supplies in very wet years, average years, and dry years, including successive dry years (SCVWD, June 2004). The IWRP concludes that SCVWD water supplies are sufficient for very wet years and normal years. In addition, the IWRP states that SCVWD will be able to meet the water needs of Santa Clara County during single dry years, even with increasing demand. However, SCVWD is challenged to meet demands in multiple dry years, when water supplies become increasingly reliant upon storage reserves, including groundwater storage with its risk of inducing land subsidence. The IWRP indicates that additional water supply management

activities must be developed to meet the water demands of Santa Clara County businesses and residents.

Groundwater Quality

Overall, groundwater quality in the Santa Clara Valley is good. The groundwater in the major producing aquifers is generally of a bicarbonate type, with sodium and calcium the principal cations (DWR, 1975). Although hard, it is of good to excellent mineral composition and suitable for most uses. Treatment has not been needed to meet drinking water standards in public supply wells (SCVWD, July 2001).

As required by the California Department of Health Services (DHS) for the Drinking Water Source Assessment and Protection (DWSAP) Program, drinking water source assessments have been conducted for the four groundwater wells. The assessment was conducted by the San José Municipal Water System (SJMWS) staff and included information gathered from City records, data bases, and staff; Water Resources Control Board; and visual field surveys. The assessments concluded that contaminants have not been detected in the four wells although the wells are vulnerable to potential contamination from local sources and activities. These include electronic manufacturing, gas stations, confirmed leaking underground storage tanks, and sewer collection systems. However, well location and construction in combination with the local hydrogeology have provided a high level of protection against contamination of the local groundwater (California DHS, 2003).

A review of available 1999 through 2002 water quality data for the four wells indicates that contaminants have not been detected above water quality standards in any of the four wells. Analyses have included regulated organic chemicals, purgeable organic compounds, and general mineral, physical and inorganic chemicals. Nitrate as nitrogen has been detected in all four wells in 1999 ranging between 1.7 and 3.6 parts per million (ppm). These detections are within the water quality standard (primary maximum contaminant level) of 10 ppm.

SCVWD has ongoing groundwater protection programs that include well permitting, well destruction, wellhead protection, leaking underground storage tank, toxic cleanup, land use and development review, nitrate management (targeted to areas of elevated nitrate in the South County), and saltwater intrusion programs (SCVWD, July 2001). SCVWD collects water quality data from 60 wells throughout the groundwater basin; five of these wells are in the North San José project area.

Saltwater intrusion has occurred in the shallow aquifer beneath North San José/Alviso. Saltwater from the Bay moves upstream during high tides and leaks through the clay cap into the upper aquifer zone when this zone is pumped (SCVWD, July 2001). Land subsidence has also aggravated this condition. Elevated salinity is also present in the lower aquifer zone but on a much smaller scale, and is attributed to improperly constructed, maintained, or abandoned wells that penetrate the clay aquitard and provide a conduit from the upper to the lower aquifer zone (SCVWD, July 2001). In response, SCVWD has established an extensive program to locate and properly destroy such conduit wells. SCVWD also monitors saltwater intrusion, collecting water

quality samples quarterly from 16 wells in the upper aquifer and 5 wells in the lower aquifer in the vicinity of the intruded area.

Recycled Water

The City of San José operates the San José-Santa Clara Water Pollution Control Plant (WPCP) located in Alviso. This plant produces recycled water that is appropriate for landscape irrigation among other uses. As described in the North San José DEIR (City of San José, March 2005), the WPCP currently treats an average of 116.8 mgd and discharges 100 mgd (dry weather peak) into San Francisco Bay. There are concerns over the environmental impacts of wastewater discharge to San Francisco Bay. In response, the City has developed a Clean Bay Strategy and a South Bay Action Plan that are intended to maintain wastewater discharge below a level of 120 mgd. Expansion of water recycling is an important part of this effort, including provision of recycled water to North San José.

Water recycling is an element of SCVWD planning for future water supplies, as summarized in the draft document, *Integrated Water Resources Planning Study 2003-Draft* (SCVWD, June 2004). Water recycling is part of SCVWD's baseline projection, which envisions recycled water use throughout Santa Clara County of 16,000 AFY by 2010, including recycled water from the WPCP. SCVWD also considers water recycling as a building block with an estimated potential future use of 33,000 AFY.

As shown in **Table 7**, water recycling has been identified as a significant water supply source for the North San José project. Recycled water can provide for landscape irrigation, ornamental features (fountains), toilet flushing, and specific industrial uses. In 2004, recycled water use amounted to 608 AF including irrigation (294 AF) and industrial uses (314 AF). It is assumed these uses will continue in the future.

The amount of water recycling was estimated for landscape irrigation purposes. For commercial/industrial buildings and some multi-family residential complexes, water used for landscape irrigation is measured by dedicated landscape irrigation meters. As shown in **Table 3,** landscape irrigation meters used 1,992 AFY in 2004 in North San Jose; an additional 381 AFY is projected to be used at buildout in 2025. An additional 294 AFY for landscape irrigation is currently being supplied by recycled water.

Some multi-family residential complexes do not differentiate between indoor/domestic and outdoor/irrigation uses, so the water use in the "Residence-Multi" category in **Table 3** includes both indoor and outdoor landscape uses. Based on the actual usage of one apartment complex in North San José, the total water use per dwelling unit is approximately 225 gpd/du, with 182 gpd/du being used indoors and the remainder used for irrigation. For projected dwelling units, 43 gpd/du (or .048 AFY/du) was used to approximate the landscape irrigation water use (225-182). Because some residential complexes have dedicated irrigation meters and some do not, only 35 gpd/du (or .039 AFY/du) for irrigation was used to calculate the current landscape irrigation that is subsumed in the residential category. This is the difference between the projected 225 gpd/du and the actual average reported multi-family usage of 190 gpd/du. Recycled water use is recent

in North San José, so only 294 AFY of existing landscape irrigation is supplied with recycled water. In the future if the existing 4,637 units are retrofit, 182 AFY of recycled water could be used for landscape irrigation, the proposed 21,573 units will use 1,040 AFY of recycled water for landscape irrigation. Using the above methodology, the landscape irrigation in 2025 that can be supplied by recycled water is estimated at 3,889 AFY. Total volume of water used in landscape irrigation that may be replaced by recycled water accounts for both new development and existing units (1,421 AFY for new development, 2,174 AFY for existing units, and 294 AFY already supplied by recycled water).

In addition to landscape irrigation, recycled water can be used to provide water to flush toilets and urinals in buildings with dual plumbing. In commercial and industrial buildings, approximately 21.9 percent of the water used indoors is used to flush toilets and urinals (Gleick et al., 2003). Assuming that all new commercial and industrial buildings include dual plumbing, an estimated 508 AFY could be provided by recycled water in addition to the 314 AFY currently used.

In sum, recycled water can supply a potential total of 4,711 AFY of the water demand in North San Jose by 2025, including 3,889 AFY for landscape irrigation, 508 AFY for toilets and urinals, and 314 AFY currently used for other industrial uses. Additional water recycling opportunities can be defined; for example, ornamental fountains and dual plumbing in residential complexes. It is noteworthy that some residential complexes in North San José already have dual plumbing for landscape irrigation.

Given that development of North San José lies in the future, it is prudent to consider that the full potential for water recycling may not prove practical. Accordingly, a reduced level of water recycling also was considered. First, recognizing the difficulty of retrofitting existing units, it was assumed that only 20 percent of existing potable irrigation would be replaced by recycled water (435 AFY). Second, the use of recycled water for future landscape irrigation was assumed to be 90 percent of the maximum calculated above (1,279 AFY), as there may be unforeseen difficulties meeting this goal. Lastly, dual plumbing was not considered in the reduced level of recycled water use, because it is not currently mandated by the City. However, all current uses of recycled water were considered to extend into the future (314 AFY industrial and 294 AFY irrigation). The reduced level of recycled water use in the North San Jose/Alviso area totals 2,322 AFY and represents a conservative and readily achievable approach to recycled water usage.

As shown in **Table 7**, recycled water has been applied previously for limited irrigation and industrial uses. Recycled water is an available source that is produced and used in the local area and is expected to increase in the future as the population increases. The City's South Bay Water Recycling program currently delivers recycled water to numerous customers in San José, Santa Clara, and Milpitas for industrial and irrigation uses. The City actively promotes water recycling through a variety of means including subsidized costs, support for regulatory compliance, public information, and ordinances requiring recycled water use, among others (City of San José, February 2001). An existing recycled water pipeline conveys water from the WPCP along the eastern boundary of the North San José area and has three extensions into the area. Increased use

of recycled water in the area would require installation of additional recycled water pipelines into North San José.

Water Supply in Normal and Drought Periods

While **Table 7** documents past, current and future water supply under normal conditions, **Tables 8 and 9** quantify the amount of water supply during normal and drought conditions, for current conditions and for projected conditions with the North San José project, respectively.

As shown in **Table 8**, North San José/Alviso currently relies on imported water from SF PUC's Hetch Hetchy system for all of its potable water supply during years with normal precipitation. The amount of water supplied in normal years has been greater than the amount contracted. During drought conditions, the amount of water supplied to North San José/Alviso is assumed to decrease by about 45 percent from normal deliveries (i.e., 5,303 AFY in 2000) to the contracted amount, 2.68 mgd or approximately 3,000 AFY. SF PUC does not currently distinguish between a single dry year and multiple dry years, so the amount of supply is the same regardless of the length of the drought. During the drought that occurred in 1988-1992, the amount of supply from Hetch Hetchy decreased from previous deliveries by about 45 percent to a low of 1,913 AFY (in 1991).

To compensate for the reduction, the City used its existing four wells; 924 AFY was pumped in 1991. For drought conditions in **Table 8**, it is assumed that groundwater would be used to a similar extent. Table 8 also documents recycled water use, which amounted to 403 AF under normal conditions in 2000. Given recycled water's recognized reliability during dry conditions, its use is not diminished in single-dry or multiple-dry years.

Table 9 presents a similar summary for the projected water supply in 2025 with the North San José project. The projected Hetch Hetchy water supply is based on the SF PUC contract for 7,100 AFY during normal conditions. In the future, SFPUC will distinguish between a drought lasting one to two years and a prolonged drought. In accordance with Bay Area Water Supply and Conservation (BAWSCA) Interim Water Shortage Allocation Plan, the City's Hetch Hetchy allocation during drought conditions would be reduced by 46.6 percent to 3,778 AFY. For prolonged droughts (those lasting more than two years), SFPUC would reduce the supply to 3,284 AFY.

As discussed in the previous section and shown in **Table 9**, future recycled water use could range from 2,322 AFY to 4,711 AFY. Recycled water is recognized for its reliability during dry conditions. Accordingly, in **Table 9**, the water supply from recycled water remains constant during normal, single dry, and multiple dry years.

As shown in **Table 9**, Hetch Hetchy and recycled water supplies would be supplemented with groundwater pumping. This is expected to occur under normal conditions and in response to drought or other scenarios involving interruption of Hetch Hetchy supply. This supplemental pumping is estimated to range from 319 to 4,170 AFY to avoid shortfalls. The City has the facilities and capacity to pump groundwater; however, it is recognized that the sufficiency of the

groundwater supply is defined not only by the capacity of City facilities, but also by the overall condition of the groundwater basin, which is a shared source of water supply. The City will work with SCVWD to better define and realize available groundwater supplies under a variety of scenarios, including drought and interruption of other supplies.

COMPARISON OF SUPPLY AND DEMAND

Table 10 provides a comparison of current water supplies and water demands under normal and drought conditions, while **Table 11** compares water supplies and demands in 2025 with the North San José project.

As indicated in **Table 10**, current water supplies are sufficient for current water demands under normal conditions, assuming continued delivery of Hetch Hetchy water at recent rates. Under drought conditions, recycled water supplies are constant, but Hetch Hetchy supplies are reduced.

Historically, the City of San José has responded to drought-induced water supply reductions in part by instituting water demand management measures; the latter measures are incorporated in the demand values for the dry years. The City of San José also has responded to drought by pumping groundwater; such pumping is incorporated in the supply values for the dry years. As noted previously, the City has the capacity to pump groundwater to meet its own water demands during drought; however, the groundwater basin is a shared resource with constraints on its use. As discussed in the previous section on Groundwater Quantity, SCVWD already is challenged to meet demands in multiple dry years without groundwater pumping at rates that risk inducing land subsidence. Accordingly, a shortfall in groundwater basin supply already exists under multi-year drought conditions. The City will work with SCVWD to better define and realize available groundwater supplies under drought conditions.

Table 11 provides the comparison of water supply and water demand under projected conditions with the North San José project. As indicated, water supplies are available to meet water demands under normal and drought conditions, assuming that Hetch Hetchy and recycled water supplies would be supplemented with groundwater pumping, as shown in **Table 9**. As indicated in **Table 9**, recycled water use will be maximized to the extent feasible in order to minimize groundwater pumping, particularly in multi-year droughts.

Long-term sufficiency of water supply for the project should also be supported through water demand management. As discussed in the previous section on Water Demand, relatively high water demand rates were applied (based on historical usage data) to estimate projected water demand. This indicates an opportunity for water demand management.

The City of San José is currently working (in cooperation SCVWD and other agencies) to conserve water and decrease overall system demand. Their ongoing work in conservation includes the following best management practices (BMPs):

- Water Survey Programs for Residential Customers
- Residential Plumbing Retrofit
- System Water Audits, Leak Detection and Repair
- Metering with Commodity Rates for All New Connections and Retrofit Existing
- Large Landscape Conservation Programs and Incentives

- High Efficiency Washing Machine Rebate Program
- Public Information Programs
- School Education Programs
- Conservation Programs for All CII Accounts
- Conservation Pricing
- Conservation Coordinator
- Water Waste Prohibition
- Residential ULF Toilets Replacement Programs

These conservation measures and other future programs will decrease the overall water demand. However, as mentioned previously, the ability for short-term drought reduction would be limited as a result of demand hardening.

Indoor residential water demand is a large portion of the total potable water demand for the proposed North San José project. If the City of San Jose takes an aggressive approach in water conservation, building on the programs already developed, the water demand can be decreased significantly. To quantify the decrease in demand, the largest indoor residential water uses were examined. Toilets, showers, and washing machines typically account for 50 to 75percent of the water used indoors in residential units. By increasing the efficiency of these uses, the residential demand can be reduced, as explained below.

The City of San José has mandated Ultra Low Flow toilets (ULFT) be installed in all new residential units built since the early 1990's. The City's plumbing code requires low flow toilets to have no greater than 2 gallons per flush. Currently ULFTs use 1.6 gallons per flush or less; as the water technology advances, toilets may use even less water (Gleick et al, 2003). Assuming that 90 percent of the units in North San José currently have two gallons per flush toilets and the remainder has four gallons per flush, retrofitting all toilets to the 1.6 gallons per flush model can save six gpd/du. Given that the projected water use is based on current usage, the total demand savings could be 175 AFY in 2025.

Showers account for about 20 percent of indoor residential water use. Efficient low flow shower heads can decrease the amount of water used per shower. Newer shower heads use approximately eight gallons of water less per shower than those on the market in the mid-1990's (Gleick et al, 2003). If two showers are taken per unit per day, the newer shower head could reduce water demand by 16 gpd/du. This change in shower heads would result in a water demand reduction of 470 AFY in 2025.

The City of San Jose currently has a program to provide rebates for high efficiency washing machines to encourage use. The average washing machine on the market in the mid-1990's used 35.8 gallons of water per load of laundry. In 2007, the water usage for a washer is required to be less than 24.2 gallons/load (Gleick et al, 2003). The average California household does 0.96 loads per day. Assuming all older washers are replaced by the new 24.2 gal/load model, the water demand would be reduced by 11gpd/du. The total reduction could be 325 AFY in 2025. The actual demand reduction may be lower as multi-family units may use the washing machines

less frequently or share communal laundry facilities.

In summary, water demand management measures will decrease the water demand from the 225 gpd/du used to calculate projected demand for multi-family residential land use. Using more efficient toilets, shower heads, and washing machines may reduce the water demand by 33 gpd/du and reduce total demand by approximately 1,000 AFY in 2025.

CONCLUSIONS

1. The proposed North San José project entails modification of plans and policies, including the City's General Plan, and implementation of infrastructure improvements to support proposed development.

2. The proposed project entails increased water demands; this report addresses the North San José/Alviso service area of the City of San José, including portions of the proposed North San José project.

3. Proposed sources of water supply include additional water from the San Francisco Public Utilities Commission (SF PUC) Hetch Hetchy system, groundwater from the Santa Clara Valley groundwater basin, which is managed by Santa Clara Valley Water District (SCVWD), and recycled water.

4. Future water demands for North San José reflect the changes in land use plans and policies described in the *North San José DEIR;* the major change is an increase in water demand for multi-family residential land uses.

5. Water demand is estimated to increase from the current (2004) 5,969.5 AFY to 12,130.3 AFY at buildout of the North San José project in 2025.

6. North San José/Alviso currently is supplied by the SF PUC Hetch Hetchy system through a contract for a temporary and interruptible supply up to 3,000 AFY (2.68 mgd).

7. The City has negotiated with SF PUC to increase its contract to 7040 AFY in 2010 and increase to 7,100 AFY in 2015.

8. The City has been able to obtain more Hetch Hetchy water than its contracted amount under normal water supply conditions; deliveries in recent years have exceeded 5,300 AFY.

9. Groundwater has been identified as a source of supplemental water supply for the project. The City has four wells in North San José and has used groundwater in the past as a supplemental supply under drought conditions. Future supplemental pumping is estimated to range from 319 to 4,170 AFY to avoid shortfalls.

10. Groundwater is actively managed by SCVWD to replenish the groundwater basin, sustain the basin's water supplies, avoid groundwater overdraft and prevent subsidence, and sustain storage reserves for use during dry periods.

11. SCVWD has analyzed the reliability of its water supplies, including groundwater, concluding that supplies are sufficient in normal and wet years. However, SCVWD is

challenged to meet demands in multiple dry years. The City will work with SCVWD to better define and realize available groundwater supplies.

12. Recycled water has been identified as a significant water supply source for the North San José project for landscape irrigation, toilet flushing and other uses. A total usage of 2,322 to 4,711 AFY is indicated for North San Jose by 2025.

13. Comparison of water supply and water demand under projected conditions with the North San José project indicates a sufficient water supply including Hetch Hetchy water for potable use, recycled water for irrigation and industrial use, and groundwater as supplemental supply.

14. Long-term sufficiency of water supply for the project also will be supported through water demand management, including use of more efficient toilets, shower heads, and washing machines.

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Table 1 Climate Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Precip, in	3.06	2.53	2.30	1.07	0.39	0.09	0.04	0.08	0.20	0.72	1.74	2.32	14.30
Temp,˚F	56.00	59.22	62.78	65.89	71.45	75.69	78.76	78.75	77.63	71.20	61.43	55.70	67.88
ETO, in	1.35	1.87	3.45	5.03	5.93	6.71	7.11	6.29	4.84	3.61	1.8	1.36	49.35

Sources: Precipitation and temperature from the NOAA NCDC San Jose station, and evapotranspiration from CIMIS San Jose station

Table 2 Population Projections

	2000	2005	2010	2015	2020	2025
City of San Jose: North San Jose	9,613	11,990	21,548	31,106	40,664	50,222
San Jose Water: North San Jose	6,010	6,576	11,178	15,780	20,382	24,984
Total North San Jose	15,623	18,566	32,726	46,886	61,046	75,206
City of San Jose: Alviso	2,128	2,292	2,470	2,660	2,866	3,088
Total North San Jose/Alviso	11,741	14,282	24,018	33,766	43,530	53,310

Table 3 Water Demand by Water Use Sectors, AFY

North San Jose **Proposed**

Customer Type	1990	1995	2000	2004	2010	2015	2020	2025
Residence - Single	0.0	84.0	130.8	133.9	133.9	133.9	133.9	133.9
Residence - Multi	537.9	510.8	700.5	854.2	2,213.4	3,572.7	4,931.9	6,291.2
Irrigation	0.0	1,179.4	1,945.8	1,991.8	2,087.1	2,182.3	2,277.6	2,372.8
Commercial	119.1	143.4	167.9	156.5	234.5	312.5	390.5	468.5
Industrial	1,766.3	1,888.2	2,056.0	2,155.1	2,157.6	2,160.1	2,162.6	2,165.1
Public	250.1	67.2	250.3	320.3	320.3	320.3	320.3	320.3
Temporary	9.4	9.0	76.0	19.0	19.0	19.0	19.0	19.0
TOTAL	2,682.7	3,882.0	5,327.3	5,630.7	7,165.7	8,700.7	10,235.7	11,770.7

Alviso **Proposed**

Customer Type	1990	1995	2000	2004	2010	2015	2020	2025
Residence - Single	122.5	113.8	148.9	169.0	171.5	174.1	176.7	179.4
Residence - Multi	53.5	129.1	34.8	40.1	40.7	41.3	41.9	42.6
Irrigation	0.0	60.8	0.0	0.0	0.0	0.0	0.0	0.0
Commercial	23.4	17.1	1.3	1.1	1.1	1.1	1.1	1.1
Industrial	28.4	8.3	51.8	99.6	101.1	102.6	104.1	105.7
Public	16.3	4.4	17.4	20.3	20.6	20.9	21.2	21.6
Temporary	2.5	0.0	17.0	8.7	8.9	9.0	9.1	9.3
TOTAL	246.8	333.5	271.2	338.8	343.9	349.0	354.3	359.6

Total **Proposed**

Customer Type	1990	1995	2000	2004	2010	2015	2020	2025
Residence - Single	122.5	197.8	279.7	302.8	305.4	308.0	310.6	313.2
Residence - Multi	591.4	639.9	735.4	894.3	2,254.1	3,614.0	4,973.8	6,333.7
Irrigation	0.0	1,240.2	1,945.8	1,991.8	2,087.1	2,182.3	2,277.6	2,372.8
Commercial	142.5	160.4	169.2	157.5	235.5	313.6	391.6	469.6
Industrial	1,794.7	1,896.6	2,107.8	2,254.7	2,258.6	2,262.7	2,266.7	2,270.8
Public	266.5	71.6	267.7	340.6	340.9	341.2	341.5	341.8
Temporary	11.9	9.0	93.0	27.8	27.9	28.0	28.2	28.3
TOTAL	2,929.5	4,215.5	5,598.5	5,969.5	7,509.6	9,049.7	10,590.0	12,130.3

Table 4 Existing Water Demand in Normal and Dry Years, AFY

					Multiple Dry Years		
Customer type	**Normal (2000)**	**1991-1992 Rebound**	**Estimated Drought Reduction**	**Single Dry**	**2**	**3**	**4**
Residence- Single	280	0.23	0.25	210	210	210	210
Residence- Multi	735	0.22 *	0.25	552	552	552	552
Commercial	169	0.17	0.15	144	144	144	144
Industrial	2,108	0.10	0.10	1,897	1,897	1,897	1,897
Public	268	0.53	0.50	134	134	134	134
Irrigation	1,946	n/a	0.40	1,167	1,167	1,167	1,167
Temporary	93	0.37	0.35	60	60	60	60
TOTAL	5,599			4,164	4,164	4,164	4,164

*Rebound based on North San Jose only.

Table 5 Future Water Demand in Normal and Dry Years, AFY

					Multiple Dry Years		
Customer type	**Normal (2025)**	**1991-1992 Rebound**	**Estimated Drought Reduction**	**Single Dry**	**2**	**3**	**4**
Residence- Single	313	0.23	0.25	235	235	235	235
Residence- Multi	6,334	0.22 *	0.25	4,750	4,750	4,750	4,750
Commercial	470	0.17	0.15	352	352	352	352
Industrial	2,271	0.10	0.10	1,703	1,703	1,703	1,703
Public	342	0.53 **	0.00	342	342	342	342
Irrigation	2,373	n/a **	0.00	2,373	2,373	2,373	2,373
Temporary	28	0.37	0.35	21	21	21	21
TOTAL	12,130			9,776	9,776	9,776	9,776

*Rebound based on North San Jose only.

**No reduction assumed for recycled water

Table 6 Water Supply Sources

Supply	AFY	Entitlement	Right	Contract	Ever used
SFPUC (Hetch-Hetchy)	3,000			x	yes
SCVWD (Groundwater)*	4,500				yes
Recycled Water**	650				yes

*The annual amount is based on a reported existing well capacity of 5,600 gpm with year-round pumping for 12 hours per day; see text.
** Recycled Water volume based on maximum usage (2003)

Table 7 Current and Projected Water Supply in a Normal Year, AFY

Water Supply Sources	1980*	1985	1990	1995	2000	2005**
SFPUC (Hetch-Hetchy)	1,756	3,255	2,443	4,357	5,303	5,300
SCVWD (Groundwater)	0	138	811	117	0	0
Recycled Water	0	0	0	0	403	608
Total	1,756	3,393	3,254	4,474	5,706	5,908

Water Supply Sources	2010	2015	2020	2025
SFPUC (Hetch-Hetchy)	7,040	7,100	7,100	7,100
SCVWD (Groundwater)	0	0 - 268	0 - 1,488	319 - 2,708
Recycled Water	1,362 - 3,645	1,682 - 4,000	2,002 - 4,355	2,322 - 4,711
Total	8,402	9,050	10,590	12,130

* The water received in the nearest normal year (precipitation within 20% of average) was selected. The water received in 1982 was used for 1980, 1985 for 1985, 1992 for 1990, 1996 for 1995, 2001 for 2000, and 2004 for 2005.

** Comparison of the total 2005 (2004) water supply of 5,908 AF with the Table 3 total water demand of 2004 (5,969.5 AF) reveals a discrepancy of 61.5 AF. This is due to differing billing cycles.

Table 8 Current supply (AF) available by source for single-dry and multiple-dry years

			Multiple Dry Years		
Source	**Normal***	**Single Dry**	**2**	**3**	**4**
SFPUC (Hetch-Hetchy)	5,303	3,000	3,000	3,000	3,000
SCVWD (Groundwater)	0	761	761	761	761
Recycled Water	403	403	403	403	403
TOTAL	5,706	4,164	4,164	4,164	4,164

* Normal year supply based on 2000

Table 9 Projected supply (AF) available by source for single-dry and multiple-dry years

			Multiple Dry Years		
Source	**Normal***	**Single Dry**	**2**	**3**	**4**
SFPUC (Hetch-Hetchy)	7,100	3,778	3,778	3,284	3,284
SCVWD (Groundwater)**	319 - 2,708	1,288 - 3,677	1,288 - 3,677	1,781 - 4,170	1,781 - 4,170
Recycled Water**	2,322 - 4,711	2,322 - 4,711	2,322 - 4,711	2,322 - 4,711	2,322 - 4,711
TOTAL	12,130	9,776	9,776	9,776	9,776

* Normal year supply based on 2025

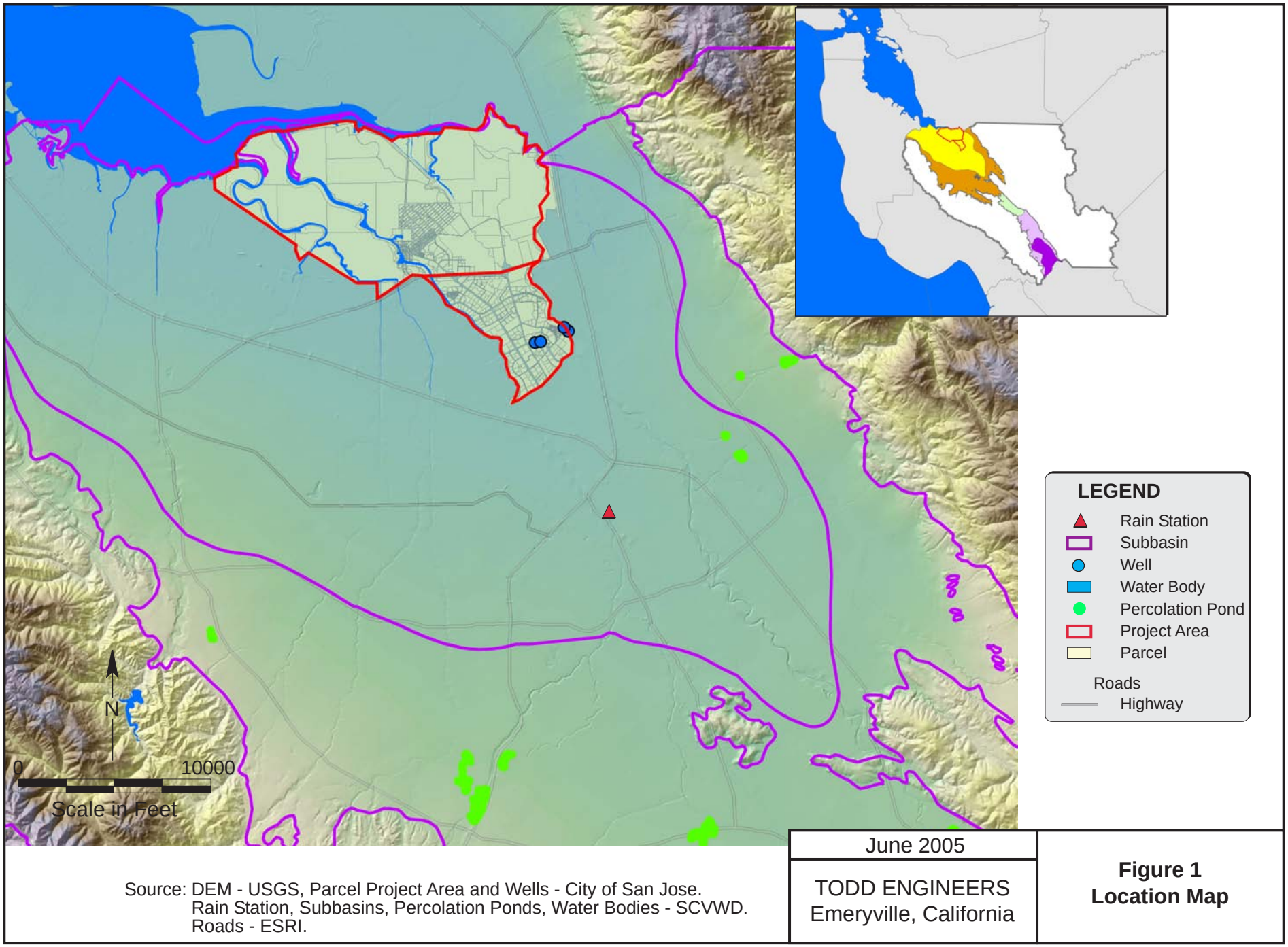
**Efforts will be made to minimize groundwater pumping and maximize recycled water use and water demand management in single dry and multiple dry years.

Table 10 Comparison of current supply and demand for normal, single dry and multiple dry years (AF)

			Multiple Dry Years		
Current Supply and Demand	**Normal**	**Single Dry**	**2**	**3**	**4**
Supply total	5,706	4,164	4,164	4,164	4,164
Demand total	5,599	4,164	4,164	4,164	4,164
Difference	108	0	0	0	0

Table 11 Comparison of 20 year projection of supply and demand for normal, single dry and multiple dry years (AF)

			Multiple Dry Years		
2025 Supply and Demand with Projec	**Normal**	**Single Dry**	**2**	**3**	**4**
Supply total	12,130	9,776	9,776	9,776	9,776
Demand total	12,130	9,776	9,776	9,776	9,776
Difference	0	0	0	0	0

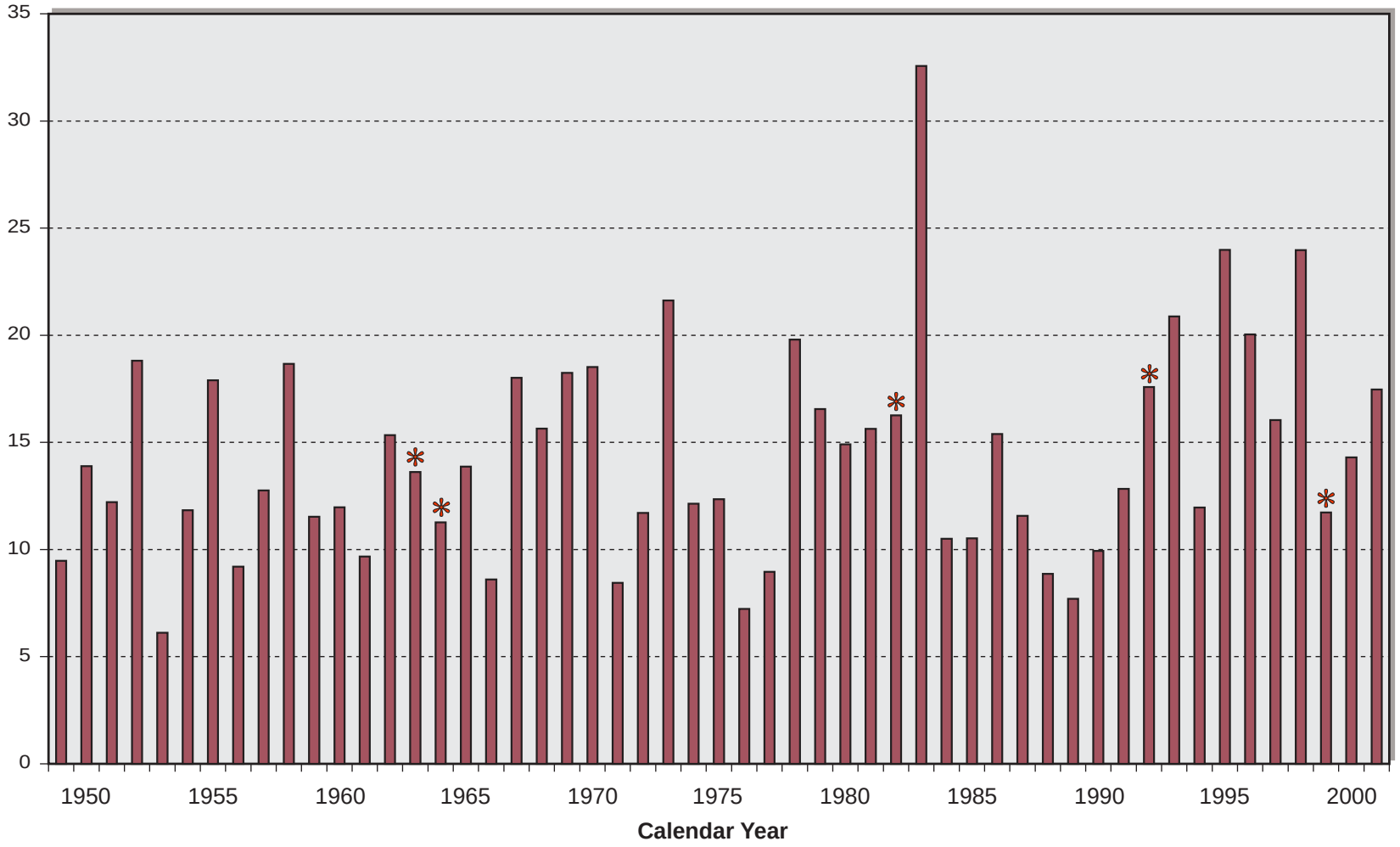


Source: DEM - USGS, Parcel Project Area and Wells - City of San Jose.
Rain Station, Subbasins, Percolation Ponds, Water Bodies - SCVWD.
Roads - ESRI.

June 2005

TODD ENGINEERS
Emeryville, California

Figure 1
Location Map

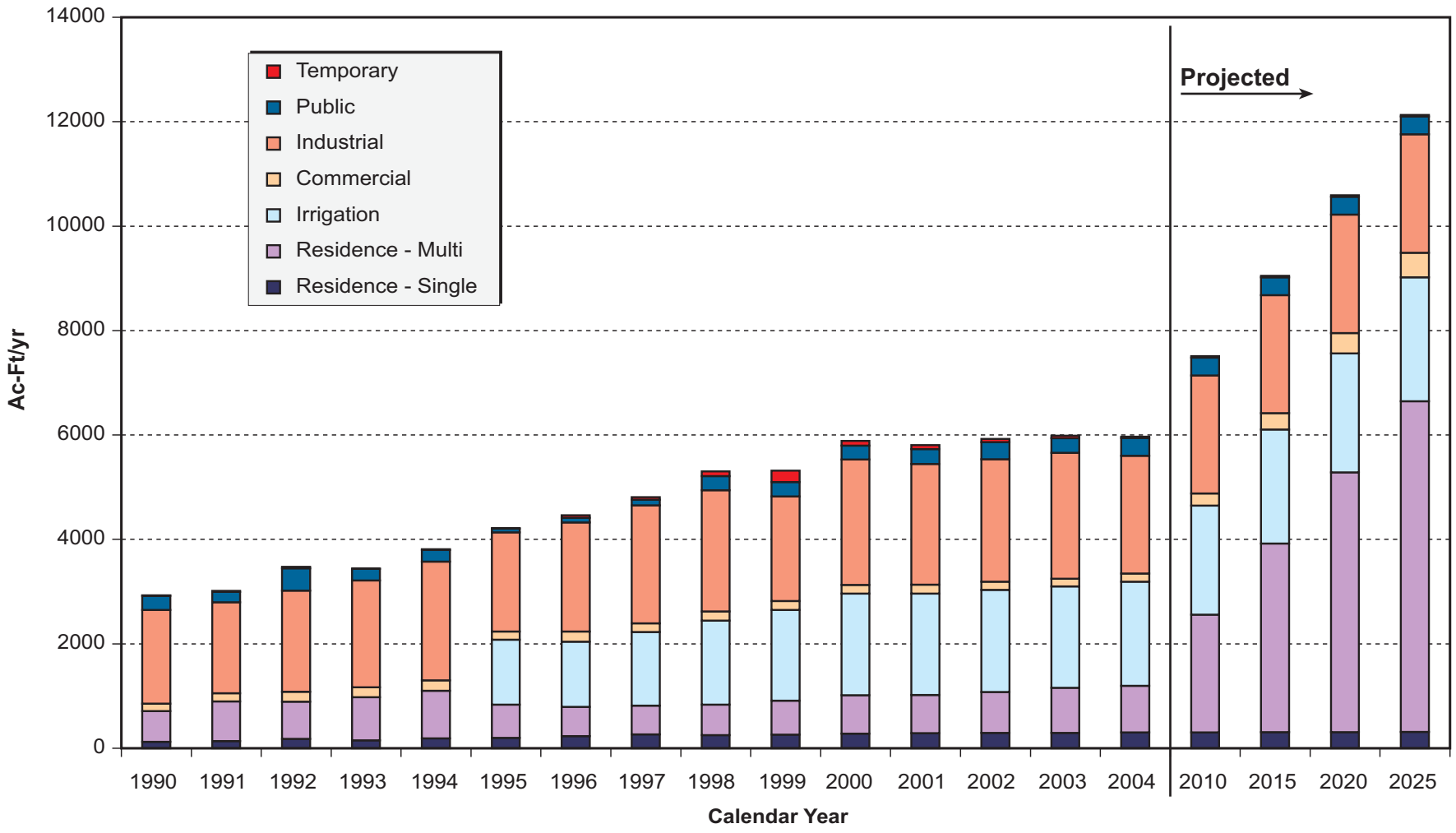


Year	* Missing Month(s)
1963	October, November, December
1964	January
1982	March
1992	August
1999	September, October

June 2005

TODD ENGINEERS
Emeryville, California

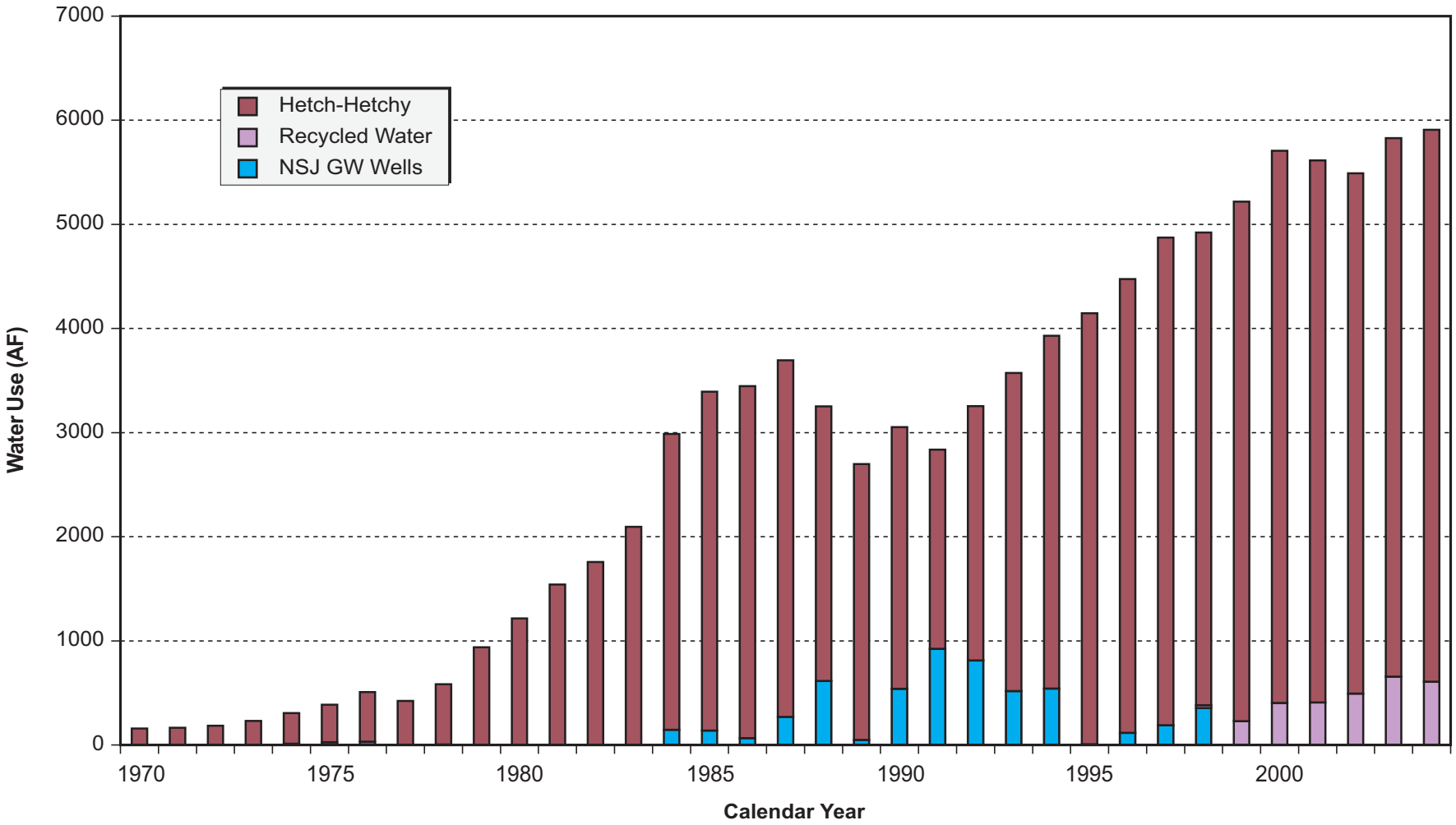
Figure 2
Yearly Precipitation
San Jose



June 2005

TODD ENGINEERS
Emeryville, California

Figure 3
North San Jose/Alviso Water Demand



June 2005

TODD ENGINEERS
Emeryville, California

Figure 4
North San Jose/Alviso Water Use

APPENDIX A

Settlement Agreement and Master Water Sales Contract between the City and County of San Francisco and Certain Suburban Purchasers

JUN 12 1984

WATER SUPPLY CONTRACT

This Contract, dated as of August 8, 1984, is entered into by and between the City and County of San Francisco ("City") and the City of San Jose ("Customer").

RECITALS

The City and the Customer have entered into a Settlement Agreement and Master Water Sales Contract ("Master Agreement"), which sets forth the terms and conditions under which the City will continue to furnish water for domestic and other municipal purposes to Customer and to other suburban purchasers. The Master Agreement contemplates that the City and each individual suburban purchaser will enter into individual contracts describing the location or locations at which water will be delivered to each purchaser by the San Francisco Water Department ("SFWD"), the purchaser's service area within which water so delivered is to be sold and other similar provisions unique to the individual purchaser. This Water Supply Contract is the Individual Contract contemplated by the Master Agreement.

AGREEMENTS OF THE PARTIES

1. Incorporation of the Master Agreement

The terms and conditions of the Master Agreement are

incorporated into this Contract as if set forth in full herein.

2. Term

The term of this Contract shall be three years and shall terminate on June 30, 1987. On or before July 1, 1985, the City shall exercise one of the options set forth in Section 9.03(a) of the Master Agreement, and if appropriate the term of this Contract shall be modified as provided therein.

3. Service Area

Water delivered by the City to the Customer may be used or sold within the service area shown on the map designated Exhibit M to the Master Agreement and Exhibit A attached hereto. Except as provided in Section 7.05 of the Master Agreement, Customer shall not use or sell any water delivered by the City outside this service area without the prior written consent of the City.

4. Location and Description of Service Connections

Sale and delivery of water to Customer will be made through a connection or connections to the SFWD system at the location or locations shown on Exhibit A attached hereto and with the applicable present account number, description, connection size, and meter size as shown on Exhibit B attached hereto.

5. Interties With Other Water Systems

Customer maintains interties with neighboring water systems at the location or locations shown on Exhibit A attached hereto and with the connection size as shown on Exhibit C attached hereto.

6. Billing and Payment

The City shall compute the amounts of water delivered and bill Customer therefor on a monthly basis consistent with existing practice. Beginning July 1, 1986, the bill shall show the separate components of the charge (e.g., service, consumption, demand). Customer shall pay the amount due within thirty (30) days after receipt of the bill.

If Customer disputes the accuracy of any portion of the water bill it shall (a) notify the General Manager of the SFWD in writing of the specific nature of the dispute and (b) pay the undisputed portion of the bill within thirty (30) days after receipt. Customer shall meet with the General Manager of the SFWD or a delegate to discuss the disputed portion of the bill.

7. Minimum and Maximum Water Delivery Levels

a. The City will deliver and Customer will pay for the following minimum annual average quantities of water:

Fiscal Year	Quantity (mgd)
1984/85	1.3
1985/86	1.4
1986/87	1.5

b. Customer's usage shall not exceed the following quantities:

Fiscal Year	Average Annual (mgd)	Day (mgd)	Hour (mgd)
1984/85	1.95	3.9	4.68
1985/86	2.10	4.2	5.04
1986/87	2.25	4.5	5.40

c. The minimum and maximum quantities set forth above in subsections 9(a) and (b) shall not obligate the City to supply Customer with any water in addition to the quantities to which Customer otherwise is entitled under Sections 7.03 and 9.03 of the Master Agreement (and Section 7.02 of the Master Agreement if that Section becomes applicable to Customer pursuant to Section 9.03(b)(i)). Nor shall the maximum quantities set forth above in Section 7(b) obligate the City to supply the peak monthly, daily, or hourly demands of Customer, except as provided in Section 7.01 of the Master Agreement.

8. Temporary Water Supply

Service to Customer under this Contract is temporary only. By supplying water to Customer, the City does not dedicate water or a water supply to Customer nor obligate

itself, contractually or otherwise, to supply water to Customer beyond the term of this Contract. Customer acknowledges that it is not presently a permanent customer of the City.

IN WITNESS WHEREOF, the parties hereto have executed this Contract, to become effective upon the effectiveness of the Master Agreement, by their duly authorized

representatives.

DATED: August 8, 1984.

Authorized by Public Utilities Commission Resolution No. 84-0144 Adopted April 10, 1984.

Romaine A. Boldridge

Romaine A. Boldridge, Secretary

Approved by Board of Supervisors ~~Resolution~~ Ordinance No. 320-84 Adopted June 28 1984.

John L. Taylor

John L. Taylor Clerk

DATED: June 18, 1984.

ATTEST:

Helen E. Jackson

Helen E. Jackson City Clerk

CITY AND COUNTY OF SAN FRANCISCO

By

Rudolf Nothenberg
General Manager of
Public Utilities

APPROVED AS TO FORM:
GEORGE AGNOST
CITY ATTORNEY
BY
UTILITIES GENERAL COUNSEL

CITY OF SAN JOSE

By Thomas McEnery

Its Thomas McEnery Mayor

Authorized by Resolution No. 57539 of the City Council of the City of San Jose

050984/2-196603Rk

Energency Connections With Other Water Systems -- Normally Closed Valving

Symbol on Exhibit A	Location	Connection With	Size
C-1	Trimble Road and Del La Cruz	City of Santa Clara	6 inch
C-2	Old Mountain View/Alviso Road and east city limits	City of Santa Clara	10 inch [proposed]

051584/3-196603Rk-2

EXHIBIT C

APPENDIX B

Master Supply Contract between City and County of San Francisco and City of San José

SETTLEMENT AGREEMENT

and

MASTER WATER SALES CONTRACT

between

THE CITY AND COUNTY OF SAN FRANCISCO

and

CERTAIN SUBURBAN PURCHASERS

in

SAN MATEO COUNTY, SANTA CLARA COUNTY
AND ALAMEDA COUNTY

ARTICLE IX

IMPLEMENTATION AND SPECIAL PROVISIONS AFFECTING CERTAIN SUBURBAN PURCHASERS

Section 9.01. *General.*

As described in Section 7.02, the City previously entered into water supply contracts with each of the suburban purchasers, typically for terms of 20 years. The initial terms of the majority of those contracts have now expired and, except as provided below, the suburban purchasers will execute new water supply contracts with the City concurrently with their approval of this Agreement. These Individual Contracts will describe the service areas of each suburban purchaser, identify the size and location of connections between the SFWD transmission system and the suburban purchaser's distribution system, provide for periodic rendering and payment of bills for water usage, and in some instances, contain additional specialized provisions unique to each purchaser and not of general concern or applicability. A sample of the Individual Contract to be entered into is attached as Exhibit L. The Individual Contracts between the City and the suburban purchasers will not contain any provisions inconsistent with Articles I through VIII of this Agreement, except: (1) as provided below in this Article; or (2) to the extent that such provisions are not in derogation of the rights that other suburban purchasers have under this Agreement and their Individual Contracts. Any provisions in an Individual Contract which are in violation of this Section shall be void.

Section 9.02. *California Water Service Company.*

The parties recognize that the California Water Service Company, one of the suburban purchasers, is a private, for-profit corporation and, as such, has no claim to co-grantee status under the Act, which specifically bars private parties from receiving for resale any water produced by the City's Hetch Hetchy system or otherwise subject to the Raker Act. The parties also recognize that the California Water Service Company is a member of the Bay Area Water Users Association, the entity which has coordinated Plaintiffs' maintenance of the action, and that the suburban purchasers have insisted upon the inclusion of the California Water Service Company as a party to this Agreement as a precondition for their own acquiescence hereto. Accordingly, the following provisions shall apply to the California Water Service Company, anything to the contrary elsewhere in this Agreement notwithstanding:

(a) The total quantity of water delivered by the City to the California Water Service Company shall not in any calendar year exceed 47,400 acre feet, unless through improvements in the City's local production facilities in Santa Clara, Alameda, San Mateo, or San Francisco Counties, made after August 21, 1961 (the date of the previous contract between the City and California Water Service Company) the City develops or has developed additional local sources in those counties, in which event the maximum stated herein may be increased by the City, upon determination by it of the need by California Water Service Company for water service in excess of the maximum stated herein. Such an increase shall automatically increase the Supply Assurance commitment to the suburban purchasers collectively (including the California Water Service Company) by an equivalent amount, but only if it is based on development of additional local sources after the effective date of this Agreement. It is agreed that the City has no obligation to deliver water to California Water Service Company in excess of the maximum stated herein, except as such maximum may be increased by the City pursuant to this subsection. Nothing in this Agreement shall preclude the City from selling water to any county, city, town, district, political subdivision, or other public agency for resale to customers within the service area of the California Water Service Company. The maximum annual quantity set forth in this subsection is intended to be a limitation on the total quantity of water that may be allocated to California Water Service Company; it is not itself intended to serve as an allocation of water under Section 7.02.

(b) Nothing in this Agreement shall require or contemplate any delivery of water to California Water Service Company in violation of the Act, which statute imposes certain obligations upon the City as a grantee from the United States in regard to the disposal of water and electricity from the Hetch Hetchy project.

(c) Nothing in this Agreement shall alter, amend or modify the Findings of Fact and Conclusions of Law and the Judgment dated May 25, 1961, in that certain action entitled *City and County of San Francisco v. California Water Service Company* in the Superior Court of the State of California in and for the County of Marin, No. 23286, as modified by the Quitclaim Deed from California Water Service Company to the City dated August 22, 1961. The rights and obligations of the City and California Water Service Company under these documents shall continue as therein set forth.

(d) Notwithstanding anything in Section 7.06 to the contrary, California Water Service Company shall have the right to assign to a public agency having the power of eminent domain all or a portion of the rights of California Water Service Company under any contract between it and the City applicable to any individual district of California Water Service Company in connection with the acquisition by such public agency of all or a portion of the water system of California Water Service Company in such district. In the event of any such assignment of all the rights, privileges and obligations of California Water Service Company under such contract, California Water Service Company shall be relieved of all further obligations under such contract provided that the assignee public agency expressly assumes the obligations of California Water Service Company thereunder. In the event of such an assignment of a portion of the rights, privileges and obligations of California Water Service Company under such contract, California Water Service Company shall be relieved of such portion of such obligations so assigned thereunder provided that the assignee public agency shall expressly assume such obligations so assigned to it.

Section 9.03. *City of San Jose and City of Santa Clara.*

The suburban purchasers recognize that the City has in the past provided water to the City of San Jose ("San Jose") and the City of Santa Clara ("Santa Clara") on a temporary and limited basis. In light of this fact, certain provisions of this Agreement shall be inapplicable to San Jose and Santa Clara, in the following respects:

(a) *City of San Jose.* The City's last agreement with San Jose expired on June 30, 1982. Water delivered to San Jose by the City between July 1, 1982 and July 31, 1983 shall be charged by the City and paid for by San Jose at the City's water rates which were in effect prior to July 31, 1983. From August 1, 1983 through June 30, 1985, the City will furnish water to San Jose at the same rates as those applicable to other suburban purchasers pursuant to this Agreement. On or before July 1, 1985, the City will exercise one of the following options with respect to its continuing water service to San Jose after that date.

(i) The City may elect to take on San Jose as a permanent customer, subject to minimum and maximum water delivery levels to be negotiated between the City and San Jose, provided that San Jose's service area and maximum annual usage during the balance of the Term of this Agreement shall not exceed those shown in Exhibit M. If the City so elects and San Jose accepts this offer: (1) San Jose will pay for water in accordance with the methodology set forth in this Agreement, such rates to be identical to those charged the other suburban purchasers; (2) water delivered to San Jose shall be included within the Supply Assurance; (3) San Jose will be entitled to a supply guarantee (to be included within the Supply Assurance) based on its usage during calendar year 1981 (500,239,960 gallons); and (4) its share of residual water will be determined in accordance with Section 7.02.

(ii) Alternatively, the City may continue to sell water to San Jose on a temporary and, after June 30, 1987, interruptible basis, but at rates identical to those charged other suburban

arising out of that certain deed dated May 22, 1884, from Charles Crocker to Spring Valley Water Works, a corporation, recorded on May 24, 1884, in Book 37 of Deeds at page 356, Records of San Mateo County, California, as amended by that certain Deed of Exchange of Easements in Real Property and Agreement for Trade in Connection Therewith, dated July 29, 1954, recorded on August 4, 1954, in Book 2628, at page 298, Official Records of said San Mateo County, or with respect to or arising out of that certain action involving the validity or enforceability of certain provisions of said deed entitled *City and County of San Francisco v. Crocker Estate Company*, in the Superior Court of the State of California in and for the County of Marin, No. 23281.

DATED: August 8, 1984

CITY AND COUNTY OF SAN FRANCISCO

By _____

Rudolph Nothenberg, General Manager
of Public Utilities

Authorized by Public Utilities Commission
Resolution No. 84-0144
Adopted April 10, 1984
Romaine A. Boldridge
Romaine A. Boldridge, Secretary

Approved as to form:

GEORGE AGNOST
City Attorney

By _____

McMorris M. Dow, Utilities General Counsel

Approved by Board of Supervisors
~~Ordinance~~ Resolution No. 320-84
Adopted June 28 1984
John L. Taylor
John L. Taylor, Clerk

DATED: JUN 04 1984

CITY OF SAN JOSE

By _____

Name: Thomas McEnery

Title: MAYOR

Authorized by Ordinance No. _____/Resolution No. 57504 /Motion
(Indicate form of action and number if appropriate)

Adopted 5-22-84, 10L
Helen E. Jackson
Name: Helen E. Jackson
Title: ~~Secretary~~/City Clerk

purchasers. If the City continues to provide water to San Jose on a temporary and, after June 30, 1987, interruptible basis, the amount of water furnished to San Jose shall not be included within the Supply Assurance. The City will provide at least two years notice to San Jose prior to termination of service, and the water delivered to San Jose after June 30, 1987, shall be limited by the City's ability to meet the full needs of all its other water customers (including in-City residents and other direct City water users). Delivery of water to San Jose may be subject to minimum and maximum water delivery levels, which will be negotiated between the City and San Jose, provided that San Jose's service area and maximum annual usage shall not exceed that set forth in Exhibit M.

(iii) Finally, the City may elect to terminate its water service to San Jose. If the City elects to exercise this option, it shall notify San Jose of its intention to do so no later than July 1, 1985, and the termination of service shall occur no earlier than July 1, 1987.

(b) *City of Santa Clara.* The City's existing contract with Santa Clara expires on June 30, 1984. From July 1, 1984 through June 30, 1985, the City shall furnish water to Santa Clara on the same rates as those applicable to other suburban purchasers pursuant to this Agreement. On or before July 1, 1985, the City will exercise one of the following options with respect to its continuing water service to Santa Clara after that date.

(i) The City may elect to take on Santa Clara as a permanent customer, subject to maximum and minimum water delivery levels to be negotiated between the City and Santa Clara, provided that Santa Clara's service area and maximum annual usage during the balance of the Term of this Agreement shall not exceed those shown in Exhibit M. If the City so elects and Santa Clara accepts this offer: (1) Santa Clara will continue to pay for water in accordance with the methodology set forth in this Agreement, such rates to be identical to those charged the other suburban purchasers; (2) water delivered to Santa Clara shall be included within the Supply Assurance; (3) Santa Clara will be entitled to a supply guarantee (to be included within the Supply Assurance) based on its usage during calendar year 1981 (633,810,320 gallons); and (4) its share of residual water will be determined in accordance with Section 7.02.

(ii) Alternatively, the City may continue to sell water to Santa Clara on a temporary and, after June 30, 1987, interruptible basis, but at rates identical to those charged other suburban purchasers. If the City continues to provide water to Santa Clara on a temporary and, after June 30, 1987, interruptible basis, the amount of water furnished to Santa Clara shall not be included within the Supply Assurance. The City will provide at least two years notice to Santa Clara prior to termination of service, and the water delivered to Santa Clara after June 30, 1987, shall be limited by the City's ability to meet the full needs of all its other water customers (including in-City residents and other direct City water users). Delivery of water to Santa Clara may be subject to minimum and maximum water delivery levels, which will be negotiated between the City and Santa Clara, provided that Santa Clara's service area and maximum annual usage shall not exceed that set forth in Exhibit M.

(iii) Finally, the City may elect to terminate its water service to Santa Clara. If the City elects to exercise this option, it shall notify Santa Clara of its intention to do so no later than July 1, 1985, and the termination of service shall occur no earlier than July 1, 1987.

(c) In signing this Agreement, neither San Jose nor Santa Clara waives any of its rights to contend, in the event the City does not elect to take it on as a permanent customer in 1987, that it is entitled to that status and to be charged rates identical to those charged other suburban purchasers under this Agreement, pursuant to the Raker Act or any other federal or state law. In signing this Agreement, the City does not waive its right to deny any or all of such contentions.

RJL:SJF:ma
5/22/84

RESOLUTION NO. 57504

RESOLUTION OF THE CITY COUNCIL OF THE CITY OF SAN JOSE AUTHORIZING AND APPROVING A SETTLEMENT AGREEMENT BETWEEN THE CITY AND COUNTY OF SAN FRANCISCO AND CERTAIN SUBURBAN PURCHASERS IN SAN MATEO COUNTY AND SANTA CLARA COUNTY AND ALAMEDA COUNTY.

WHEREAS, for the last several years the City, as a member of the San Francisco Bay Area Water Users Association, has supported litigation, Palo Alto v. San Francisco, in which the objective allocation of water costs between San Francisco and its suburban customers was the main issue; and

WHEREAS, said Settlement Agreement provides that City of San Jose will continue to receive water from San Francisco until June 30, 1985; and

WHEREAS, after the June 30, 1985 date, San Francisco may choose to take the City on as a permanent customer, continue to sell water on an interruptable basis or terminate water service whereby termination will not occur before June 1, 1987; and

WHEREAS, said Settlement Agreement provides for objective allocation of water costs to the suburban users and sufficient water to meet the City of San Jose needs for the short term.

NOW, THEREFORE, BE IT RESOLVED that the Settlement Agreement be hereby approved.

ADOPTED this 22nd day of May 1984, by the following vote:

AYES: ALVARADO, BEALL, FLETCHER, HAMMER, IANNI, RYDEN, SAUSEDO, WILLIAMS AND LEWIS

NOES: NONE

ABSENT: ESTRUTH AND McENERY

Shirley Lewis

SHIRLEY LEWIS VICE Mayor

ATTEST:

Helen E. Jackson

Helen E. Jackson, City Clerk

APPENDIX C

Letter from San Francisco Public Utilities Commission (Paula Kehoe) to City of San José (Mansour Nasser) re: wholesale purchase projections, June 1, 2004 with Attachment A-3.

SAN FRANCISCO PUBLIC UTILITIES COMMISSION
PLANNING BUREAU
1145 Market Street, Suite 401 San Francisco, CA 94103 • Tel. (415) 934-5700• Fax (415) 934-5751

June 1, 2005

City of San Jose
Mansour Nasser
3025 Tuers Rd.
San Jose, CA 95121

Dear Mr. Nasser:

On May 27, 2005, the San Francisco Public Utilities Commission (SFPUC) sent you a letter with information pertaining to the SFPUC's water supply reliability to assist you with the development of your Urban Water Management Plan.

Upon review of the 2005 wholesale purchase projections used in the analysis, it was determined that there was a miscommunication on the figures used for the 2005 water purchase projections. The SFPUC used the average purchase estimate rather than the FY 03-04 purchase estimate shown in BAWSCA's *Attachment A-3 Sample Calculation*. Enclosed is the revised projection of FY 03-04 and is reflected in Table 1.

We apologize for any inconvenience this may have caused. Please do not hesitate to contact me if you have any questions or comments. I can be reached at (415) 554-0792.

Sincerely,

Paula Kehoe /m
Manager of Water Resources Planning

cc: Nicole Sandkulla

Attachment A-3. Suburban Shortage Allocations

Assumptions and Column Notes

P. 03

Avg. Shortage for the Suburban Purchasers = 23.6%
Water available to the Suburban Purchasers = 135.93 mgd

'olumn notes:

llocation Basis. The Allocation Basis is used for calculating Allocation Factors and is the average of the following three components:

1. First Fixed Component: The greater of either the Supply Assurance values or the three-year average of SFPUC purchases for FYs 1996-97, 1997-98, and 1998-99, with certain exceptions.
   a. Daly City's and Purissima Hill's values are based on their three-year averages, which is greater than their Supply Assurance values.
   b. Hayward's and Estero's values are based on their 2010-11 projected purchases, as reported in the BAWUA 1997-98 Annual Survey.
   c. San José's and Santa Clara's values are based on the water supply caps in their individual water supply contracts with the SFPUC.
2. Second Fixed Component: The average of SFPUC purchases for FYs 1996-97, 1997-98, and 1998-99.
3. Variable Component: The rolling three-year average, updated annually, beginning with FYs 1996-97, 1997-98, and 1998-99.
4. Average: The average of columns 1, 2, and 3.

'nadjusted Allocations. The initial shortage allocations in column 6 are adjusted for Santa Clara and San José in columns 10 through 13.

5. Allocation Factors: The ratio of each Suburban Purchaser's column 4 average to the column 4 total.
6. Initial Shortage Allocation: The product of each Suburban Purchaser's column 5 Allocation Factor times the column 6 total, which represents the assumed available water supply.
7. FY 2003-04 Purchases: The most recent year's purchases to which the Shortage Allocation can be compared to determine the effective cutback.
8. Purchase Cutback: Column 6 minus column 7, in mgd.
9. Purchase Cutback: The ratio of column 8 to column 7, in percent.

llocations Adjusted for Santa Clara and San José. This adjustment is made so that Santa Clara's and San José's cutbacks are at least as great as the highest cutback by the permanent customers.
ı this example, there is no adjustment required for San José because the formula results in an unadjusted cutback that is already greater than the highest cutback by a permanent customer.

10. Subtotal Allocation Factors: The ratio of each permanent Suburban Purchaser's column 4 average to the column 4 subtotal.
11. Adjusted Shortage Allocation. The product of each Suburban Purchaser's column 10 Subtotal Allocation Factor times the Column 11 subtotal.
    a. The column 11 subtotal is the sum of the column 6 subtotal plus the Santa Clara adjustment.
    b. The Santa Clara adjustment is the difference between its column 6 Initial Shortage Allocation and its Adjusted Shortage Allocation.
    c. Santa Clara's Adjusted Shortage Allocation is the product of its column 4 average and the largest Purchase Cutback received by the permanent Suburban Purchasers.
12. Adjusted Purchase Cutback: Column 11 minus column 7, in mgd.
13. Adjusted Purchase Cutback: The ratio of column 12 to column 7, in percent.

JUN-06-2005 10:59

Table 1
Projected San Jose, City of (portion of north San Jose) Deliveries for Three Multiple Dry Years Given Year 2005 Purchase Request

	Purchase Request Year 2005 mgd	One Critical Dry Year	Current Deliveries during Multiple Dry Years in mgd		
			Year 1	Year 2	Year 3
System-Wide Shortage in Percent	0%	10%	10%	20%	20%
BAWSCA Allocation mgd	177.9	157.4	157.4	136.8	136.8
San Jose, City of (portion of north San Jose)	4.84	3.37	3.37	2.93	2.93

Table 2
UWMP Studies: Water Supply Reliability
Water Supply Options for Years 2010 through 2030

	2010	2015	2020	2025	2030
Crystal Springs Reservoir (22bg)	x	x	x	x	x
Westside Basin Groundwater afa	4,500	7,000	8,100	8,100	8,100
Calaveras Reservoir Recov. (31.5 bg)		x	x	x	x
Districts Transfer afa	23,200	23,200	29,000	29,000	29,000

Attachment A-3 Sample Calculation

23.6% Average Suburban Reduction from FY 03-04 Purchases

(Units in million gallons per day unless otherwise noted)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
	Allocation Basis				Unadjusted Allocations					Allocations Adj. for Santa Clara & San José				
Suburban Purchasers	First Fixed Component	Second Fixed Component	Variable Component	Average	Allocation Factors	Initial Shortage Allocation	FY 03-04 Purchases	Initial Purchase Cutback		Subtotal Allocation Factors	Adjusted Shortage Allocation	Adjusted Purchase Cutback		Final Individual Share
ACWD	13.76	11.95	12.25	12.65	7.10%	9.65	12.31	-2.66	-21.63%	7.47%	9.76	-2.55	-20.72%	7.18%
Belmont	3.89	3.26	3.44	3.53	1.98%	2.69	3.52	-0.82	-23.43%	2.08%	2.72	-0.79	-22.55%	2.00%
Brisbane	0.46	0.30	0.39	0.38	0.22%	0.29	0.39	-0.10	-25.03%	0.23%	0.30	-0.09	-24.16%	0.22%
Burlingame	5.23	4.68	4.72	4.88	2.74%	3.72	4.77	-1.05	-22.07%	2.88%	3.76	-1.01	-21.17%	2.77%
Coastside	2.18	1.35	1.78	1.77	0.99%	1.35	1.89	-0.54	-28.70%	1.04%	1.36	-0.53	-27.87%	1.00%
Cordilleras	0.01	0.01	0.00	0.01	0.00%	0.00	0.01	0.00	-24.99%	0.00%	0.00	0.00	-24.12%	0.00%
CWS Total	35.50	33.51	36.21	35.07	19.68%	26.74	38.25	-11.51	-30.08%	20.70%	27.05	-11.20	-29.27%	19.90%
Daly City	4.49	4.49	4.72	4.57	2.56%	3.48	4.94	-1.46	-29.53%	2.70%	3.52	-1.42	-28.71%	2.59%
East Palo Alto	2.18	2.10	2.09	2.12	1.19%	1.62	2.19	-0.58	-26.22%	1.25%	1.64	-0.56	-25.37%	1.20%
Estero	7.23	5.45	5.49	6.06	3.40%	4.62	5.58	-0.96	-17.17%	3.58%	4.67	-0.90	-16.21%	3.44%
Guadalupe	0.52	0.27	0.33	0.38	0.21%	0.29	0.33	-0.04	-13.01%	0.22%	0.29	-0.04	-12.08%	0.21%
Hayward	24.00	17.56	18.30	19.95	11.19%	15.22	19.59	-4.38	-22.35%	11.78%	15.39	-4.20	-21.45%	11.32%
Hillsborough	4.09	3.60	3.78	3.82	2.14%	2.92	3.91	-1.00	-25.53%	2.26%	2.95	-0.97	-24.67%	2.17%
Los Trancos*														0.00%
Menlo Park	4.24	3.43	3.58	3.75	2.10%	2.86	3.84	-0.98	-25.56%	2.21%	2.89	-0.95	-24.69%	2.13%
Millbrae	3.15	2.64	2.39	2.73	1.53%	2.08	2.58	-0.50	-19.25%	1.61%	2.11	-0.47	-18.31%	1.55%
Milpitas	9.23	6.80	6.94	7.66	4.30%	5.84	7.10	-1.27	-17.83%	4.52%	5.91	-1.20	-16.87%	4.34%
Mountain View	13.46	10.36	10.91	11.58	6.50%	8.83	10.96	-2.13	-19.42%	6.83%	8.93	-2.03	-18.49%	6.57%
North Coast	3.84	3.29	3.48	3.54	1.98%	2.70	3.59	-0.89	-24.81%	2.09%	2.73	-0.86	-23.94%	2.01%
Palo Alto	17.07	12.96	13.06	14.37	8.06%	10.95	13.33	-2.38	-17.85%	8.48%	11.08	-2.25	-16.90%	8.15%
Purissima Hills	1.85	1.85	2.19	1.96	1.10%	1.49	2.31	-0.81	-35.22%	1.16%	1.51	-0.79	-34.47%	1.11%
Redwood City	10.93	10.92	11.73	11.19	6.28%	8.53	12.16	-3.63	-29.82%	6.61%	8.63	-3.53	-29.00%	6.35%
San Bruno	3.25	2.01	2.43	2.56	1.44%	1.95	2.41	-0.46	-18.97%	1.51%	1.97	-0.43	-18.03%	1.45%
Skyline	0.18	0.16	0.17	0.17	0.10%	0.13	0.18	-0.05	-28.57%	0.10%	0.13	-0.05	-27.74%	0.10%
Stanford	3.03	2.58	2.43	2.68	1.50%	2.04	2.51	-0.47	-18.78%	1.58%	2.07	-0.45	-17.83%	1.52%
Sunnyvale	12.58	10.73	9.56	10.95	6.14%	8.35	9.84	-1.49	-15.15%	6.46%	8.45	-1.39	-14.17%	6.22%
Westborough	1.32	0.98	1.01	1.10	0.62%	0.84	0.97	-0.13	-12.98%	0.65%	0.85	-0.12	-11.97%	0.63%
Subtotal	187.67	157.23	163.38	169.43		129.20	169.48	-40.28	-23.77%	100.00%	130.70	-38.78	-22.88%	
San José	2.68	4.10	4.65	3.81	2.14%	2.91	4.84	-1.94	-40.03%		2.91	-1.94	-40.03%	2.14%
Santa Clara	6.57	4.72	3.77	5.02	2.82%	3.83	3.59	0.23	6.51%		2.33	-1.27	-35.22%	1.71%
Total	196.92	166.06	171.80	178.26	100.00%	135.93	177.92	-41.99	-23.60%		135.93	-41.99	-23.60%	100.00%

Derivation of the Santa Clara/San José adjustment:

1.	Largest permanent customer cutback:	-35.22%
2a.	Adjusted Santa Clara shortage allocation:	2.33 (Applying largest permanent customer cutback)
2b.	Santa Clara adjustment:	-1.50 (Difference between initial and adjusted alloc.)
3a.	Adjusted San José shortage allocation:	3.14 (Applying largest permanent customer cutback)
3b.	San José adjustment:	0.00 (Difference between initial and adjusted alloc.)
4.	Total Adjustment:	-1.50 (2b + 3b)

*All values associated with Los Trancos County Water District have been included within Cal Water value

Table 3

Allocation	SFPUC Purchase: San Jose, City of (portion of north San					SFPUC Purchase: All Wholesale Customers mgd				
Delivery for Year beginning July 1	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
	Projected Delivery in mgd					Projected System-wide Delivery in mgd				
	2010	2015	2020	2025	2030	2010	2015	2020	2025	2030
1920	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1921	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1922	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1923	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1924	6.28	6.34	6.34	6.34	4.40	188.9	191.6	197.5	203.6	185.7
1925	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1926	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1927	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1928	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1929	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1930	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1931	3.96	4.02	4.15	4.28	3.84	167.3	169.7	175.0	180.5	161.9
1932	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1933	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1934	3.96	6.34	6.34	6.34	4.40	167.3	191.6	197.5	203.6	185.7
1935	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1936	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1937	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1938	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1939	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1940	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1941	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1942	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1943	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1944	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1945	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1946	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1947	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1948	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1949	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1950	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1951	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1952	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1953	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1954	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1955	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1956	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1957	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1958	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1959	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1960	6.28	6.34	6.34	6.34	4.40	188.9	191.6	197.5	203.6	185.7
1961	3.96	4.02	4.15	3.73	3.84	167.3	169.7	175.0	157.4	161.9
1962	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1963	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1964	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1965	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1966	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1967	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1968	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1969	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1970	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1971	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1972	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1973	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1974	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1975	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1976	6.28	6.34	6.34	6.34	4.40	188.9	191.6	197.5	203.6	185.7
1977	3.45	4.02	4.15	3.73	3.84	145.6	169.7	175.0	157.4	161.9
1978	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1979	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1980	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1981	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1982	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1983	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1984	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1985	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1986	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1987	6.28	6.34	6.34	6.34	4.40	188.9	191.6	197.5	203.6	185.7
1988	3.96	4.02	4.15	4.28	3.84	167.3	169.7	175.0	180.5	161.9
1989	3.96	4.02	4.15	4.28	4.40	167.3	169.7	175.0	180.5	185.7
1990	3.45	4.02	3.61	3.73	3.84	145.6	169.7	152.5	157.4	161.9
1991	3.45	4.02	4.15	3.73	3.84	145.6	169.7	175.0	157.4	161.9
1992	3.45	3.50	3.61	3.73	3.84	145.6	147.8	152.5	157.4	161.9
1993	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1994	6.28	6.34	6.34	6.34	4.40	188.9	191.6	197.5	203.6	185.7
1995	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1996	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1997	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1998	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
1999	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
2000	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
2001	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4
2002	6.28	6.34	6.34	6.34	6.34	188.9	191.6	197.5	203.6	209.4